

indicated that: some expected nuclear (i.e., rising) stress patterns were perceived as falling stress patterns; reduced stress levels occur in subordinate phrases and on repetitive words in coordinate constructions; and sequences of prenominal adjectives have falling stress patterns like compound constructions. These and other results are examined with the other perception techniques, which more directly verify relative stress levels. [Work supported in part by NSF and ARPA.]

SS4. Boundaries in the perception of continuous speech. J. G. Martin (Department of Psychology, University of Maryland, College Park, MD 20742)

There were 48 "sentences" (e.g., "LAS a BAS a LAS, a GAS a LAS a PAS" or "KAS a LAS a PAS, a LAS a BAS a LAS") each pronounced with a slight phraselike boundary after the fifth syllable. Four groups of practiced subjects pressed a reaction-time (RT) button to their assigned segmental target /b, d, g, or k/ which occurred equally often in syllables one, three, five (first phrase), seven, nine or eleven (second phrase). The decrease in target RT as a function of time into the sentence was not monotonic. Instead, target RT decreased successively within the first phrase, but increased after the boundary before decreasing again within the second phrase. This "scallop" effect suggests a relative discontinuity across boundaries in both production and perception. Phrases are units in the sense that articulatory-acoustic sequential redundancy (correlation) is higher within than between phrases. In perception, such redundancy facilitates increased ease in "tracking" the successive syllables in a phrase until the boundary is reached. [Work supported by NIH.]

SS5. Speech evoked potentials in response to grammatical structures. S. Mark Clardy, Mary Ellen Hayden, and Sadanand Singh (The University of Texas Health Science Center at Houston Speech and Hearing Institute, Houston, TX, 77030) Edward L. Reilly (Electroencephalography and Clinical Neurophysiology Laboratory, Hermann Hospital, 1203 Ross Sterling, Houston, TX 77030)

The purpose of the present study was to monitor the electrophysiological responses to phrases varying in degree of grammaticality, congruity, and markedness. Eight English phrases were synthetically produced to control duration, amplitude, and alignment. These were composed of "I," "She," "A," or "Three" followed by the nonsense word "wug" or its morphophonemically marked counterpart "wugs." Cortical evoked potentials were monitored from F_7 , F_8 , and midway between T_3 and P_3 , and midway between T_4 and P_4 (International 10-20 Systems of the Electrode Placement), each referenced to the ipsilateral earlobe. Ten male, right-handed subjects between the ages of 20-30 years were solicited from among The University of Texas Health Science Center at Houston faculty and students. Ss were told to listen with eyes closed and to avoid movement. Evoked responses were averaged over 64 randomly ordered presentations of each stimulus, thus yielding a total of 512 presentations per S. Preliminary analysis indicates that the AEPs on the right were similar regardless of grammatical complexity, congruity, or markedness. AEPs on the left, however, were more variable depending on grammatical factors.

SS6. Perceptual synthesis of deleted phonemes. James A. Bashford, Jr. and Richard M. Warren (Psychology Department, University of Wisconsin-Milwaukee, Milwaukee, WI 53201)

Addition of noise to gaps produced by deletion of speech segments has been reported to result in both illusory continuity and increased intelligibility. Earlier work in this lab involving phonemic restorations within single noise filled gaps in sentences has suggested that such multiple perceptual restorations may represent a linguistic adaptation of a nonverbal phenomenon.

"Temporal induction" permits perceptual synthesis of contextually appropriate sounds when deleted segments of a signal are replaced by noise with intensity and spectral characteristics capable of masking the signal were it really present in the noise. A series of experiments used broadband and filtered speech consisting of PB word lists, CID sentence lists, and speech passages. Periodic interpolated noise bursts were varied in spectral composition, and it was found that illusory restoration of continuity followed the spectral rules for nonverbal temporal induction. While illusory speech continuity of word lists could occur without an increase in intelligibility, illusory continuity of connected speech improved intelligibility through restoration of contextually appropriate phonemes. Temporal induction becomes coupled with special linguistic mechanisms permitting perceptual synthesis of phonemes from noise when sufficient contextual information is available.

SS7. Psychoacoustical correlates of phonetic features in Spanish sounds. M. Guirao (Laboratorio de Investigaciones Sensoriales, Consejo Nacional de Investigaciones Científicas y Técnicas, Buenos Aires, Argentina, C.C.53.SUC.53)

This work attempts to describe a correspondence between acoustical signals, psychoacoustical dimension, and phonetic features. The speech material consisted of the 22 Spanish phonemes, as they are pronounced in South American countries. Seventeen consonants (followed by /a/) and the five Spanish vowels were first analyzed acoustically to determine their spectral characteristics and then grouped into three classes: periodic sounds, bands of noise, and bursts of noise. The same array of phonemes served to perform a perceptual test with the participation of 32 subjects. The subjects were instructed to assign numerical values to the sounds according to their apparent levels of intensity (low-soft), volume (large-small), density (compact-diffuse) and tonal quality (acute-grave). The phoneme /p/ in /pa/, called 10, was used as a standard. Participants also divided the sample into continuant and interrupted sounds. Preliminary results suggest that attributes of auditory sensation appear to be relevant in the differentiation of phonetic units.

SS8. Developmental differences in labeling VOT continua with varied fundamental frequency. Lynne E. Bernstein (Auditory Research Laboratory, Northwestern University, Evanston, IL 60201)

Adults have been shown to use fundamental frequency in classifying the voicedness of phonemes [M. Haggard *et al.*, *J. Acoust. Soc. Am.* **47**, 613-617 (1970); D. Massaro and M. Cohen, *J. Acoust. Soc. Am.* **60**, 704-717 (1976)]. The F_0 cue has an additive effect for adults. As F_0 increases, more stimuli are labeled as unvoiced. This study compares the relative effects of voice onset time and F_0 cues in two types of labeling tasks performed by adults and children. It is hypothesized that the use of secondary cues such as F_0 lags the VOT cue developmentally. VOT continua were synthesized from /gate/ to /Kate/ using values from +5 to +70 ms and three F_0 's (105, 135, and 165 Hz). In condition I, adults and children (ages 3 and 7 years) are respectively instructed to write or say the word they hear. Condition II is a 2 AFC labeling task. Condition I allows insight into how subjects make choices in condition II. Adult's data indicate a significant effect for F_0 in both conditions. In condition I, adults make place errors on the unvoiced ends of continua. Data from children are being collected and a comparison will be made between their performance and adult's for both conditions.

SS9. Grinning from ear-to-ear: The perception of smiled speech. V. C. Tartter (Bell Laboratories, Murray Hill, NJ 07974)

The perceptual and acoustic effects of pronouncing speech with lips spread in a smile were assessed. Smiled and straight-faced tokens of 25 nonsense syllables and four meaningful sentences were